

# ***Interactive comment on “A case study of the spectral parameters of ULF fluctuations before substorms with no evident trigger in the interplanetary space” by Nataliya Sergeevna Nosikova et al.***

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This paper presents a case study of ULF oscillations observed in the magnetotail by Cluster, on the ground with ground magnetometers, and in ionospheric density. The paper demonstrates coherence between the different magnetospheric regions. As with the other reviewer, I find the connection (or not) with substorms tenuous, at best. Conclusions 1 & 2 are conjecture but are not supported by the data in the paper. I suggest simply removing that aspect, so I will not repeat those concerns here – but I fully concur with the other reviewer.

I have some questions regarding the spectral analysis and data presentation. With respect to external vs. internal driving of the oscillations, I would encourage the authors to examine the solar wind number density, in addition to the IMF, as the solar wind dynamic pressure – whose variations are driven primarily by number density variations – is the largest driver of ULF pulsations in this frequency range. The fact that these pulsations were observed in the polar cap certainly limits the internal mechanisms.

I also would like to see a bit more information on how the spectra were computed. The paper mentioned a low-pass filter – what was the filter type? It is important to present those details, as certain techniques (e.g., running average) can introduce spurious spectral signals. The spectra look very smooth, so I'm curious as well how those were computed. The paper states Blackman-Tukey but, specifically, what is the effective Rayleigh frequency of the analysis? The spectra look very smooth. Finally, it is difficult to judge the purported peak near 1.5 mHz without seeing the lower frequencies. I suggest plotting to the zero frequency so a reader can see the context for this peak. Relative to the background, the peak near 1.5 looks little different than other peaks (e.g., near 3 mHz). Plotting to lower frequencies would help the reader be able to determine significance, at least visually. There are statistical tests one could apply as well (see our recent Kepko, Viall & Wolfinger paper for one, but there are many others), and I would encourage looking at those, although the cross-coherence is an indicator that these are geophysical phenomena.

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Discussion paper

